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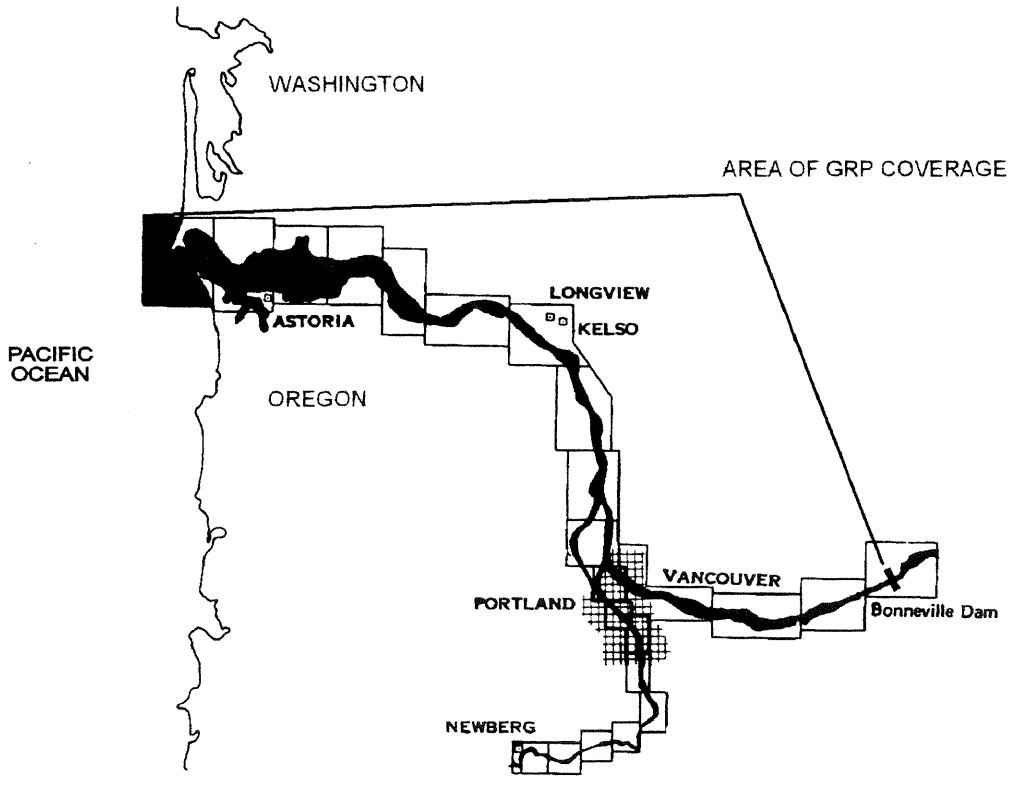
LOWER COLUMBIA RIVER OREGON/WASHINGTON GEOGRAPHIC RESPONSE PLAN (GRP)



Lower Columbia River
Oregon/Washington
Geographic Response Plan

Prepared for the Northwest Area Committee by a joint committee comprised of local, state and federal government, tribal and industry representatives.
(For specific contributors, see Appendix B.)

Published by the Washington State Department of Ecology

Publication No. 95-258

SPILL RESPONSE CONTACT SHEET

Required Notifications For Hazardous Substance or Oil Spills

USCG National Response Center	**(800) 424-8802**
In Oregon:	
Department of Emergency Management	**(800) 452-0311**
In Washington:	
Emergency Management Division	**(800) 258-5990**
Department of Ecology Southwest Regional Office	**(360) 407-6300**

U.S. Coast Guard

National Response Center	**(800) 424-8802**
Marine Safety Office Puget Sound:	
Watchstander	**(206) 217-6232**
Safety Office	(206) 217-6232
Marine Safety Office Portland:	
Watchstander	**(503) 240-9301**
Safety Office	(503) 240-9379
Pacific Strike Team	**(415) 883-3311**
District 13:	
MEP/drat	(206) 220-7210
Command Center	(206) 220-7021
Safety Officer	(206) 220-7242
Public Affairs	(206) 220-7237
Vessel Traffic Service (VTS)	(206) 217-6050

Environmental Protection Agency (EPA)

Region 10 Spill Response	**(206) 553-1263**
Washington Ops Office	(360) 753-9083
Oregon Ops Office	(503) 326-3250
Idaho Ops Office	(208) 334-1450
RCRA/ CERCLA Hotline	(800) 424-9346
Public Affairs	(206) 553-1203

National Oceanic & Atmospheric Administration

Scientific Support Coordination	(206) 526-6829
Weather	(206) 526-6087

Canadian

Marine Emergency Ops/Vessel Traffic	(604) 666-6011
Environmental Protection	(604) 666-6100
B.C. Environment	(604) 356-7721

Department of Interior

Environmental Affairs	(503) 231-6157

U.S. Navy

Naval Shipyard	(360) 476-3466
Naval Base Seattle	(360) 315-5440
Supervisor of Salvage	(202) 695-0231

Army Corps of Engineers

Hazards to Navigation	(206) 764-3754
Bonneville Dam Control Room	**(503) 378-8338**

*** Boldface type are 24 hour numbers**

Federal O.S.R.O./ State Approved Response Contractors

Airo Services	(253) 383-4916
Anchorage Launch Service Co.	(503) 297-4588
Clean Pacific Alliance	(800) 593-4272
Clean Sound Coop	(425) 744-0948
Cowlitz Clean Sweep, Inc.	(360) 423-6316
FOSS Environmental - Seattle	(206) 767-0441
- Portland	(503) 283-1150
Fred Devine	(503) 283-5285
Global Environmental	(206) 623-0621
Island Oil Spill Association	(360) 378-5322
MSRC	(425) 252-1300
Northwest EnviroField Services	(206) 762-1190
Olympus Environmental	(206) 735-6625
Pacific Link Environmental	(360) 733-2483
Smith Environmental Service	(800) 334-0004
Spencer	(503) 655-0896
Temco	(360) 371-2052
Tidewater Environmental	(503) 289-4274
&	(360) 695-8088

Washington State

Department of Ecology Headquarters	(360) 407-6900
Southwest Region	**(360) 407-6300**
Northwest Region	**(425) 649-7000**
Central Region	**(509) 575-2490**
Eastern Region	**(509) 456-2926**
Department of Fish and Wildlife	**(360) 534-8233**
Emergency Management Division	(360) 438-8639
	(800) 258-5990
State Patrol	**(360) 753-6856**

Oregon State

Department of Environmental Quality	
Headquarters (Portland)	(503) 229-5733
Northwest Region (Portland)	(503) 229-5263
Eastern Region (Portland)	(503) 338-6146
Eastern Region (Pendleton)	(503) 278-4063
Western Region (Lower Col. River)	(503) 269-2721
Western Region (Eugene)	(503) 686-7838
Western Region (Medford)	(503) 776-6010
Western Region (Salem)	(503) 378-8240
Emergency Management	**(503) 378-6377**
	(800) 452-0311
Stop Oregon Littering/Vandalism	(503) 647-9855

HOW TO USE THIS GEOGRAPHIC RESPONSE PLAN

Purpose of Geographic Response Plan (GRP)

This plan prioritizes resources to be protected and allows for immediate and proper action. By using this plan, the first responders to a spill can avoid the initial confusion that generally accompanies any spill.

Geographic Response Plans are used during the emergent phase of a spill which lasts from the time a spill occurs until the Unified Command is operating and/or the spill has been contained and cleaned up. Generally this lasts no more than 24 hours. The GRPs constitute the federal on-scene coordinators' and state on-scene coordinators' "orders" during the emergent phase of the spill. During the project phase the GRP will continue to be used, but with input from natural resource trustees.

Strategy Selection

Chapter 4 contains complete strategy descriptions in matrix form, response priorities, and strategy maps. The strategies depicted in Chapter 4 will be implemented after reviewing on scene information including: tides, currents, weather conditions, oil type, initial trajectories, etc.

It is assumed that control and containment at the source is the number one priority of any response. If, in the responder's best judgment, this type of response is infeasible then the priorities laid out in Chapter 4, Section 2 take precedence over containment and control.

It is important to note that strategies rely on the spill trajectory. A booming strategy listed as a high priority would not necessarily be implemented if the spill trajectory and booming location did not warrant action in that area.

The strategies discussed in this GRP have been designed for use with persistent oils and may not be suitable for other petroleum or hazardous substance products. The Northwest Area Contingency Plan will address releases of hazardous substances in the future. At that time this GRP may also address hazardous substances.

Note that GRPs only address protection of sensitive **public** resources. It is the responsibility of private resource owners and/or potentially liable parties to address protection of private resources (such as commercial marinas, private water intakes, and non-release aquaculture facilities).

On Scene

After determining which strategies will be used, assignments are made. Once developed, each responder, contractor, and/or cooperative will be provided with an individual strategy sheet and map containing the information necessary for implementation. This "tear-out" section can then be taken directly to the field by the responder. Strategy Tear-Out Sheets are not complete and are therefor not included in this version of the GRP.

Standardized Response Language

In order to avoid confusion in response terminology, this GRP uses standard Unified Command terminology and strategy names which are defined in Appendix A, Table A-1 (e.g. diversion, collection, exclusion).

Response Equipment

A table outlining equipment availability and response times is being developed for this geographic response plan. In the interim, strategies will be deployed in the order equipment arrives on scene and as directed/selected by the on-scene commander.

Lower Columbia River

Geographic Response Plan

Record of Changes

Date	Change Number	Summary of Changes	Initials of person making change
August, 1992	Original Release	N/A	N/A
February 1, 1995	1st Change	Replacement of entire document, including revised strategies based on field verification.	
March 1, 1996	2nd Change	Minor updates to assorted text; revisions to numerous strategy maps and matrices	
December 31, 1997	3rd Change	Revisions to assorted text, strategy maps and matrices; addition of lower Willamette River	

Record of Changes Continued

Date	Change Number	Summary of Changes	Initials of person making change

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Lower Columbia River, Oregon/Washington

GEOGRAPHIC RESPONSE PLAN

1. Introduction: Scope of this Project

Geographic Response Plans are intended to help the first responders to a spill avoid the initial confusion that generally accompanies any spill. This document serves as the federal and state on-scene-coordinators "orders" during a spill in the area covered by this GRP (see Chapter 3 for area covered). As such, it has been approved by the U.S. Coast Environmental Protection Agency and the Washington State Department of Ecology Spill Program. Changes to this document are expected as more testing is conducted through drills, site visits, and actual use in spill situations. To submit comments/corrections/suggestions please use Appendix C.

GRPs have been developed for the marine waters of Washington and Oregon, and are in the process of being developed for inland areas of Washington, Oregon and Idaho. They are prepared through the efforts and cooperation of the Washington Department of Ecology, Washington Department of Fish and Wildlife, Oregon Department of Environmental Quality, Idaho State Emergency Response Commission, the U.S. Coast Guard, the Environmental Protection Agency, tribes, other state and federal agencies, response organizations, and local emergency responders.

GRPs were developed through workshops involving federal, state, and local oil spill emergency response experts, response contractors, and representatives from tribes, industry, ports, environmental organizations, and pilots. Workshop participants identified resources which require protection, developed operational strategies, and pinpointed logistical support.

Following the workshops, the data gathered was processed and reproduced in the form of maps and matrices which appear in Chapters 4 through 6. The maps were generated using MacIntosh Canvas while the matrices were created using Excel for Windows. The balance of each GRP was produced using Word for Windows.

The first goal of a GRP was to identify, with the assistance of the Washington State Natural Resource Damage Assessment Team, resources needing protection; response resources (boom, boat ramps, vessels, etc.) needed, site access and staging, tribal and local response community contacts, and local conditions (e.g. physical features, hydrology, currents and tides, winds and climate) that may affect response strategies. Note that GRPs only address protection of sensitive **public** resources. It is the responsibility of private resource owners and/or potentially liable parties to address protection of private resources (such as commercial marinas, private water intakes, and non-release aquaculture facilities).

Secondly, response strategies were developed based on the sensitive resources noted, hydrology, and climatic considerations. Individual response strategies identify the amount and type of equipment necessary for implementation. The response strategies are then applied to likely spill scenarios for oil movement, and prioritized, taking into account factors such as feasibility, wind, and tidal conditions.

Draft strategy maps and matrices were then sent out for review and consideration of strategy viability. Field verification was conducted, and changes proposed by the participants were included in a semi-final draft which was offered for final review to all interested parties and the participants of the field verification.

Finally, the general text of the GRP was compiled along with the site description, reference maps and logistical support.

Items included in Logistical Support:

- Location of operations center for the central response organization;
- Local equipment and trained personnel;
- Local facilities and services and appropriate contacts for each;
- Site access & contacts;
- Staging areas;
- Helicopter and air support;
- Local experts;
- Volunteer organizations;
- Potential wildlife rehabilitation centers;
- Marinas, docks, piers, and boat ramps;
- Potential interim storage locations, permitting process;
- Damaged vessel safehavens;
- Vessel repairs & cleaning;
- Response times for bringing equipment in from other areas.

2. Site Description

The Lower Columbia River addressed in this GRP includes that lower portion of the Columbia River from Bonneville Dam to the estuary at the mouth of the river, a distance of approximately 145 miles, and the lower Willamette River from Willamette Falls to the confluence with the Columbia, a distance of approximately 26 miles. The lower portion of the 1,210 mile long Columbia River contains an extensive variety of fish, wildlife, and habitat. For this reason, compounded by industry use along its shorelines, larger vessels and increased vessel traffic, this area is highly vulnerable to environmental damage by oil or hazardous materials spills.

Terrain varies from sandy beaches to intermittent rocky areas of rip-rap and intertidal zones with steep cliffs that have limited or no access. The varied stretches of sandy beach represent areas of significant human use. Portions of the riverbank are steep, completely inaccessible rocky cliffs. Other areas are rocky intertidal to cobble type beaches. There are many mid-stream rocks and sand islands that provide bird rookeries and marine mammal haulouts. Interspersed along both the Columbia and Willamette rivers are many small freshwater drainages.

2.1. Physical Features

Use of the Columbia River and lower Willamette River waterways throughout the year by many species of wildlife in a variety of stages of development, at locations scattered all along the lower length of the river is well documented. As a result there are 11 major wildlife refuges and state parks located between the Portland/Vancouver area and the Pacific Ocean.

The outflow of the Columbia River forms a vast estuary. This estuary is a meeting point between saltwater and fresh water and the surrounding land. The resulting fragile environment is characterized by highly variable physical, chemical, and biological conditions, allowing organisms from saltwater and fresh water and land to proliferate with great abundance and diversity. Components of this estuary includes tidelands, salt mashes, sandspits, uplands, and river channels, all of which interact to create a highly productive habitat.

This GRP addresses the lower 145 miles of the Columbia River and the lower 26 miles of the Willamette River. In addition to the miles of sandy beaches and its sensitive estuary, the Columbia River has its flow augmented by the confluence of the flows from the following creeks and rivers:

Hamilton Creek - Hamilton Creek lies approximately 142 miles east of the Columbia River mouth.

Sandy River - Sandy River lies approximately 121 miles east of the Columbia River mouth.

Washougal River - Washougal River lies approximately 121 miles east of the Columbia River mouth.

Willamette River - Willamette River lies approximately 102 miles east of the Columbia River mouth.

Lake River - Lake River lies approximately 88 miles east of the Columbia River mouth.

Lewis River - Lewis River lies approximately 85.5 miles east of the Columbia River mouth.

Kalama River - Kalama River lies approximately 73 miles east of the Columbia River mouth.

Cowlitz River - Cowlitz River lies approximately 68 miles east of the Columbia River mouth.

Mill/Germany/Abernathy Creeks - Mill/Germany/Abernathy Creeks lie approximately 55 miles east of the Columbia River mouth.

Clatskanie River - Clatskanie River lies approximately 50 miles east of the Columbia River mouth.

Elochoman River - Elochoman River lies approximately 41 miles east of the Columbia River mouth.

Skamokawa Creek - Skamokawa Creek lies approximately 33 miles east of the Columbia River mouth.

Big Creek - Big Creek lies approximately 28 miles east of the Columbia River mouth.

Crooked Creek - Crooked Creek lies approximately 23 miles east of the Columbia River mouth in Grays Bay.

Grays River - Grays River lies approximately 22.5 miles east of the Columbia River mouth in Grays Bay.

Deep River - Deep River lies approximately 21 miles east of the Columbia River mouth in Grays Bay.

John Day River - John Day River lies approximately 18 miles east of the Columbia River mouth.

Youngs River - Youngs River lies approximately 13.5 miles east of the Columbia River mouth in Youngs Bay.

Lewis & Clark River - Lewis & Clark River lies approximately 13 miles east of the Columbia River mouth In Youngs Bay.

Chinook River - Chinook River lies approximately 5 miles east of the Columbia River mouth in Baker Bay.

Wollacut River - Wollacut River lies approximately 4 miles east of the Columbia River mouth in Baker Bay.

Significant tributaries to the Willamette River include:

Clackamas River – Clackamas River lies approximately 25 miles south of the Willamette River mouth.

Oswego Creek – Oswego Creek lies approximately 21 miles south of the Willamette River mouth.

Johnson Creek – Johnson Creek lies approximately 19 miles south of the Willamette River mouth.

Kellogg Creek – Kellogg Creek lies approximately 19 miles south of the Willamette River mouth.

This additional water volume, along with the natural water disturbances created by the variances of the riverbank and current flow, create numerous rips, back eddies, and still waters. These will cause the spilled oil to concentrate at various points along the rivers. The oil will also tend to strand and ground at the high water line on a falling tide and on the outside of bends.

2.2. Hydrology

Because of the density differences between the fresh water flowing downriver and the salt water driven upriver by tidal forces, a two-layered system or "tidal wedge" develops in the Columbia River, where the surface current moves downstream and the bottom, saltier water moves upstream. This wedge can be apparent as far upriver as Tongue Point (rm 18) and is usually associated with a turbidity maximum

2.3. Currents and Tides

Water levels and velocities in the Lower Columbia River are a function of several factors: seasonal runoff, tidal effects, and the volume of water released by upstream dams. Information from several sources have been included in an effort to give a general view of the river conditions.

Tides: The tides of the Pacific Northwest are semidiurnal - meaning there are two high waters and two low waters each tidal day. Tidal effects on the Columbia River can be felt during low river flow up to Warrendale, Oregon (approximately River Mile 141). Data for stations above Harrington Point apply only during low river stages. The tidal range for the Columbia River is greatest near the mouth, with the tidal influence decreasing upriver. The mean tidal range (MHW-MLW) at Astoria is 6.6 feet and the diurnal range (MHHW-MLLW) is 8.4 feet. The mean tidal range at Warrendale, Oregon is 0.4 feet and the diurnal range is 0.6 feet.[1]

Currents: The tidal current in the Columbia River is always modified by the river discharge, sometimes to the extent that the flood current is indiscernible and the current ebbs continuously. The lower Columbia River is subject to annual freshets (flooding) in the late fall and early winter when rains are the heaviest. Short range predictions on river flow are available from the NOAA Weather Service Northwest River Forecast Center in Portland, Oregon.

Multnomah Channel Effect: The Multnomah Channel runs from the Willamette River to the Columbia River on the southwest side of Sauvie Island. During the spring and early summer when flow rates down the Columbia River are high, the water level of the Columbia River may be higher than the water level in the Willamette River at their confluence. When this occurs, part of the Columbia River will actually flow up the Willamette River until it reaches the Multnomah Channel. At this point, the combined flow of both rivers will be directed downstream through Multnomah Channel until it converges again with the main stream of the Columbia River.

Oil spilled in the Willamette River or on the Columbia upriver from the Willamette confluence will flow down the Multnomah Channel. At the Willamette River/Multnomah Channel confluence, the converging currents create a slack water which tends to disperse the pollutants to both sides of the Willamette River.

The average surface water velocity for the lower Columbia River at Vancouver is 1 - 1.5 knots downstream. Surface water velocity in the lower Columbia at low summer/fall flow is 0.5 knots upstream on an incoming high tide, and 1.0 knots downstream on an outgoing low tide.

The average surface water velocity for the Willamette River at Portland is 0.5 knots downstream. Surface water velocity in the Willamette River at low summer/fall flow is 0.3 knots upstream on an incoming high tide, and 0.5 knots downstream on an outgoing low tide.[2,3]

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[1] National Oceanic and Atmospheric Administration, 1995. Tide Tables West Coast of North & South America.
[2] National Oceanic and Atmospheric Administration, 1995. Tide Tables Pacific Coast of North & South America.
[3] Columbia River Pilots Assn. March 9,1995. Presentation at Columbia River Oil Transfer Location Workshop.

2.4. Winds

The northern coast can be affected by strong winds, at times in excess of 100 miles per hour. These winds typically come from the north to northwest in the summer and the southeast to east in the winter. During the summer, the predominant wind direction is from the northwest with speeds ranging from 10 to 15 knots. However maximum peak wind gusts range from 30 to 40 knots. The mean wave heights are about 4.9 feet with maximum heights of 14.7 feet. In the winter, the winds are primarily from the east to southeast at 10 t 15 knots with maximum peak wind gusts ranging from about 55 to 65 knots. Average wave heights are 4.9 feet with maximum wave heights of 32.8 feet. In particular, the coastal mountain range deflects winds so that they tend to flow parallel to the coastline. In areas with lower mountains, this effect may not be as prominent. Winds in Astoria and Portland have an annual mean velocity of 8 knots with directions varying throughout the year.

2.5. Climate

The entire coast is characterized by a maritime climate with cool summers and mild winters. Air temperatures are in the mid 40's in the winter and the low 60's in the summer. Water temperatures are fairly constant, normally in the low 50's. Annual rainfall varies between Astoria and Portland. Astoria averages 66.34" per year and Portland averages 37.61" per year.

2.6. Risk Assessment

VESSELS

The primary transportation patterns for the Trans-Alaskan Pipeline Trade that affect the Oregon Coast are between Prince William Sound and Richmond, California. The routes for major shipping traffic keep the super tankers 50-60 NM off shore. This distance is believed to minimize coastal effects from a catastrophic spill.

Refined product in barges and small tankers is transported closer to the shoreline and up the Columbia River as far as Pasco, Washington. There are on the average, 160 tank barge movements as well as 50-60 bunkering operations by barge to a variety of vessels per month. The majority of these bunker barges have a capacity of 15,000 bbls.

Annually, self propelled tankers make approximately 100 port calls to the Portland area. The majority of the tank vessels are approximately 39,000 dwt tonnage, having capacity of approximately 275,000 bbls, although the largest have a capacity of 400,000 bbls. Supertankers in ballast also transit the river enroute the Portland Ship yard for routine inspections and maintenance. Approximately 2000 general cargo, bulk, and container vessels enter the river annually, carrying bunker fuels of approximately 15,000 barrels capacity.

The largest spill in Columbia River history occurred in 1984 when the T/V Mobiloil ran aground on Warrior Rock near the north end of Sauvie Island. This grounding allowed for the spewing of 200,000 gallons of refined oil to the surrounding area. The 1979 *Oil Spill Protection Plan for the Natural Resources of the Lower Columbia and Willamette Rivers* published by DEQ was implemented and cleanup ensued. There was still not an abundance of cleanup equipment positioned along the river at this time, so response was hampered.

More recently this river system has fallen prey to a series of bunkering and cargo transfer related spills, the largest of which was the 11,000 gallon discharge of Intermediate Fuel Oil (IFO) 380 from the M/V

Tai Chung at the Columbia Aluminum Facility along the Willamette River (RM 10) just upstream of Swan Island in December of 1991. The product was a thick, viscous oil with high persistency on the affected shoreline. Two similar bunkering mishaps occurred within six months of each other at Longview Anchorage (RM 65). The M/V Central spewed approximately 3,000 gallons of IFO 180 on the morning of June 3, 1993, when the fill valve to tank 5 starboard was not fully closed. This allowed fuel to continue entering the tank unknown to the vessel's crew, until it flowed from the tanks on deck vent and over the side. High river discharge kept the majority of oil in the main navigational channel and flushed it downriver.

Six months later, on January 10, 1994, the M/V An Ping 6 replayed the events the of M/V Central and spilled a similar amount of product at the same location. River discharge was 1/3 the volume of the earlier incident, and portions of the Washington shoreline were badly impacted. Heaviest oiling was found in and around Fisher Island, and cleanup lasted a full 30 days. Response mechanisms were in place by this time and boom and skimmers were deployed as part of the Maritime Fire and Safety Association's Vessel Umbrella Contingency Plan.

A series of other bunker and transfer related spills have plagued the Columbia River, usually with a lighter, less persistent product. Routine training by the covered facilities, the Clean Rivers Cooperative, Maritime Fire and Safety Association, and various contractors helps ensure discharges will be efficiently contained and recovered.

FACILITIES

Both the Columbia and Willamette Rivers are home to many oil facilities. Very little crude oil is transported to these facilities, with the majority being refined products heading to the large tank farms along the lower Willamette. Over half the oil transported to the region daily comes through pipeline, which crosses the river at various locations.

Of the approximately 30 facilities in this region, the smallest have 1 surface tank with a volume of 10,000 bbls whereas the largest facilities have as many as 100 surface tanks with a capacity of 1.8 million bbls. Many of these tanks are kept within unlined, earthen secondary containment berms capable of holding 100% of the tank contents. These facilities may be vulnerable to natural disasters, equipment failures, and other catastrophes that could lead to a partial or complete loss of tank contents. As a result of recent state and federal legislation, most facilities maintain several thousand feet of harbor and sorbent boom and a means of deployment on site.

With a river current in excess of one knot and sometimes 2 - 3 knots, the time frame in which to respond to contain and/or divert moving oil is very short. History has shown that oil can move from the Port of Vancouver area to the mouth of the Columbia river in less than three days. Boom identified in planning workshops require 54,400 feet of boom to implement all the response strategies.

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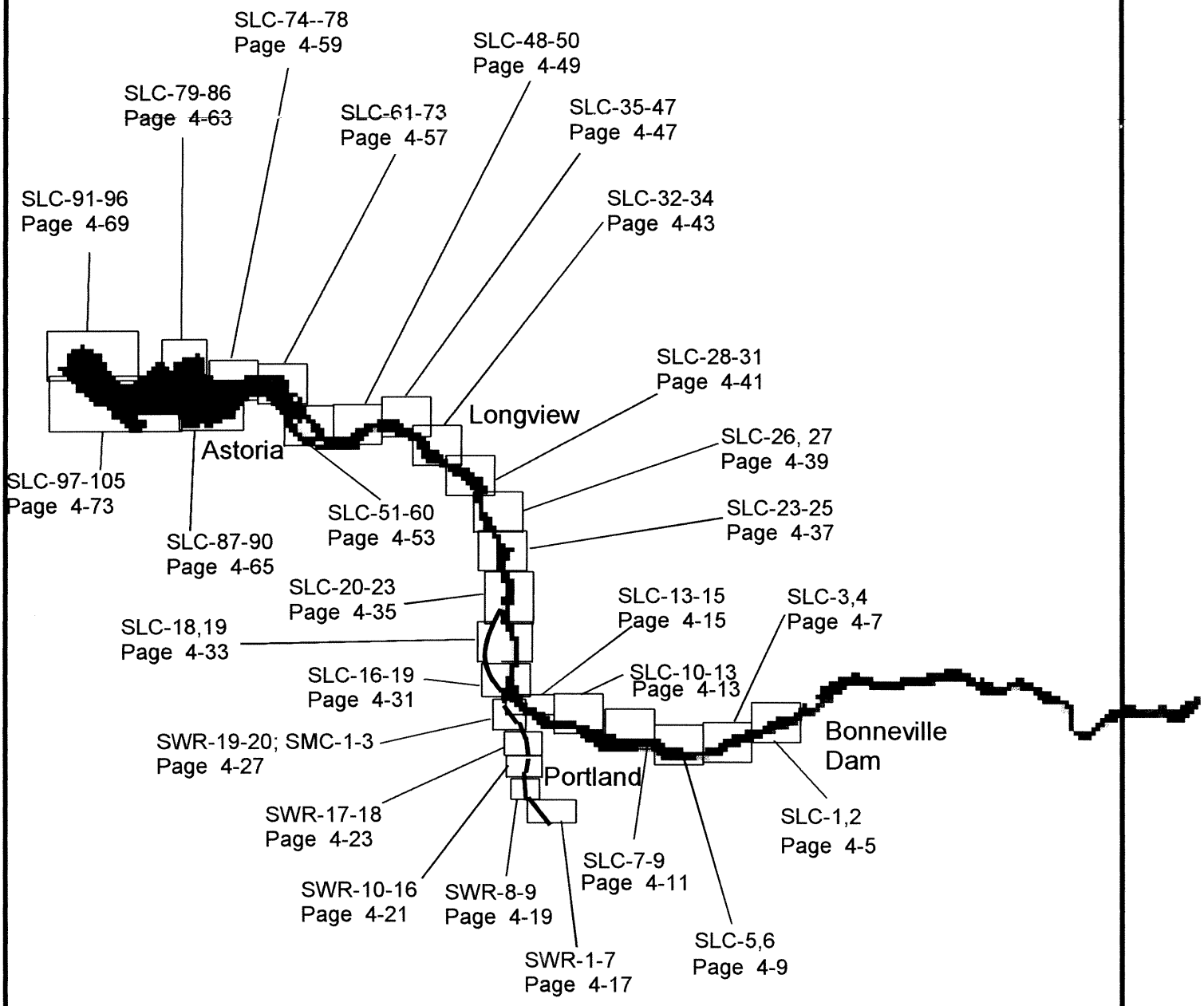
LOWER COLUMBIA KEY MAP

3. Reference Map

This map lists response strategies for the Lower Columbia River and Lower Willamette Rivers.

Refer to Section 4.2 for priorities and Section 4.3 for Strategy specific information



December 31, 1997

APPENDICES

Appendix A: Summary of Protection Techniques

Protection Techniques	Description	Primary Logistical Requirements	Limitations
ONSHORE			
Beach Berms	A berm is constructed along the top of the mid-inter tidal zone from sediments ex-cavated along the downgradient side. The berm should be covered with plastic or geo-textile sheeting to minimize wave erosion.	• Bulldozer/Motor grader -1 • Personnel - equipment operator & 1 worker • Misc. - plastic or geotextile sheeting	• High wave energy • Large tidal range • Strong along shore currents
Geotextiles	A roll of geotextile, plastic sheeting, or other impermeable material is spread along the bottom of the supra-tidal zone & fastened to the underlying logs or stakes placed in the ground.	• Geotextile - 3 m wide rolls • Personnel - 5 • Misc. - stakes or tie-down cord	• Low sloped shoreline • High spring tides • Large storms
Sorbent Barriers	A barrier is constructed by installing two parallel lines of stakes across a channel, fastening wire mesh to the stakes & filling the space between with loose sorbents.	Per 30 meters of barrier • Wire mesh - 70 m x 2 m • Stakes - 20 • Sorbents - 30 m^2 • Personnel - 2 • Misc. - fasteners, support lines, additional stakes, etc.	• Waves > 25 cm • Currents > 0.5 m/s • Tidal range > 2 m
Inlet Dams	A dam is constructed across the channel using local soil or beach sediments to exclude oil from entering channel.	• Loader - 1 • Personnel - equipment operator & 1 worker or several workers w/shovels	• Waves > 25 cm • Tidal range exceeding dam height • Freshwater outflow

NEARSHORE			
Containment Booming	Boom is deployed in a "U" shape in front of the oncoming slick. The ends of the booms are anchored by work boats or drogues. The oil is contained within the "U" & prevented from reaching the shore.	For 150 meters Slick: • Boom - 280 m • Boats - 2 • Personnel - boat crews & 4 boom tenders • Misc. - tow lines, drogues, connectors, etc.	• High winds • Swells > 2 m • Breaking waves > 50 cm • Currents > 1.0 m/s
Exclusion Booming	Boom is deployed across or around sensitive areas & anchored in place. Approaching oil is deflected or contained by boom.	Per 300 meters of Boom • Boats - 1 • Personnel - boat crew & 3 boom tenders • Misc.- 6 anchors, anchor line, buoys, etc.	• Currents > 0.5 m/s • Breaking waves > 50 cm • Water depth > 20 m
Deflection Booming	Boom is deployed from the shoreline away from the approaching slick & anchored or held in place with a work boat. Oil is deflected away from shoreline.	Single Boom, 0.75 m/s knot current • Boom - 60 m • Boats - 1 • Personnel - boat crew + 3 • Misc. - 3 anchors, line, buoys, recovery unit	• Currents > 1.0 m/s • Breaking waves > 50 cm
Diversion Booming	Boom is deployed from the shoreline at an angle towards the approaching slick & anchored or held in place with a work boat. Oil is diverted towards the shoreline for recovery.	Single Boom, 0.75 m/s knot current • Boom - 60 m • boats - 1 • Personnel - boat crew + 3 • Misc. - 3 anchors, line, buoys, recovery unit	• Currents > 1.0 m/s • Breaking waves > 50 cm
Skimming	Self-propelled skimmers work back & forth along the leading edge of a windrow to recover the oil. Booms may be deployed from the front of a skimmer in a "V" configuration to increase sweep width. Portable skimmers are placed within containment booms in the area of heaviest oil concentration.	Self-propelled (None) Towed • Boom - 200 m • Boats - 2 • Personnel - boat crews & 4 boom tenders • Misc. - tow lines, bridles, connectors, etc. Portable • Hoses - 30 m discharge • Oil storage - 2000 liters	• High winds • Swells > 2 m • Breaking waves > 50 cm • Currents > 1.0 m/s

Appendix B: Original Geographic Response Plan Contributors

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Dean Lackey, Fred Devine Diving & Salvage
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Evart Smith, Brix Maritime
Paul Stevenson, Columbia River Pilots
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Steve Jeffries
Jeff Skriletz
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Mike Barber
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Mike Ramsey

Washington State Patrol
Lonnie Brackins
Robert Johnson

State Representatives - Oregon

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Oregon Department of Environmental Quality
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Jack Wylie
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Oregon Department of Fish & Wildlife
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Oregon State Parks
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United States Coast Guard
Christina Bjergo
Mark Corcoran
James Crawford
Chris Curatilo
Glenn Epler
Rod Leland
Rob Myles
Daniel Neptun
Janice Page
Greg Schultz
Paul Slyman

National Oceanic and Atmospheric Administration
Ken Barton
Sharon Christopherson
Jerry Galt
Doug Helton
Gary May

U.S. Department of Interior
Charles Polityka
Preston Sleeger

U.S. Fish and Wildlife Service
Colleen Henson
Al Clark
Elizabeth Materna
Carol Schuler

National Park Service
Curt Ahola
Cynthia Orlando

Appendix C: Geographic Response Plan Comments/Corrections/Suggestions

If you have any questions regarding this document or find any errors, please notify one of the following agencies: or use tear out sheet (page C-3)

- Washington Department of Ecology, SPPR program, Natural Resources Unit
- USCG Marine Safety Office Puget Sound, Planning Department
- USCG Marine Safety Office Portland
- Oregon Department of Environmental Quality
- Idaho Emergency Response Commission
- Environmental Protection Agency Region 10

Phone Numbers:

Washington DOE	(360) 407-6972
USCG MSO Puget Sound	(206) 217-6213
USCG MSO Portland	(503) 240-9307
Oregon DEQ	(503) 229-5774
Idaho ERC	(208) 334-3263
EPA	(206) 553-6901

Bulletin Board System (BBS):

USCG MSO Puget Sound	(206) 217-6216
USCG MSO Portland	(503) 240-9308

Internet/E-mail Address:

WADOE	dald461@ecy.wa.gov
OR DEQ	WYLIE.Jack@deq.state.or.us
USCG MSO Puget Sound	jlehto@pacnorwest.uscg.mil
USCG MSO Portland	mwilcox@pacnorwest.uscg.mil
USEPA	sheldrake.beth@epamail.epa.gov

Address:

Commanding Officer
United States Coast Guard
MSO Puget Sound
Planning Department
1519 Alaskan Way South
Seattle, WA 98134-1192

Washington Department Of Ecology
SPPR Program
Natural Resources Unit
P.O. Box 47600
Olympia, WA 98504-7600

Office Of The Governor
Idaho Emergency Response Commission
1109 Main
Statehouse
Boise, ID 83720-7000

Commanding Officer
United States Coast Guard
Planning Department
MSO Portland
6767 North Basin Ave
Portland, OR 97217-3992

Oregon Department of Environmental Quality
Water Quality Division
811 SW Sixth Avenue
Portland, OR 97204

Environmental Protection Agency
Emergency Response Branch
1200 Sixth Avenue
Seattle, WA 98101

Geographic Response Plan

Comments/Corrections/Suggestions

Directions:
Fill in your name, address, agency, and phone number. Fill in the blanks regarding the location of information in the plan being commented on. Make comments in the space provided. Add extra sheets as necessary. Submit to:

Dale Davis
Department of Ecology
Spills Program
300 Desmond Drive
P.O. Box 47600
Olympia, WA 98504-7600
dald461@ecy.wa.gov

Name: _____ Title:_____ Agency:_____

Address:_____

City: _____ State/Province:_____ Zip/Postal Code:_____

Phone: (____) _____ E-Mail:_____

GRP:_____Page Number:_____

Location on page (chapter, section, paragraph) (e.g. 2.1, paragraph 3):_____

Comments:_____

Northwest Area Committee
c/o Washington Department of
Ecology
Spills Program
Natural Resources Unit - GRP
Corrections
P.O. Box 47600
Olympia, WA 98504-7600